



[4910-13-P]

**DEPARTMENT OF TRANSPORTATION**

**Federal Aviation Administration**

**14 CFR Part 39**

**[Docket No. FAA-2014-0170; Directorate Identifier 2013-NM-169-AD]**

**RIN 2120-AA64**

**Airworthiness Directives; The Boeing Company Airplanes**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** We propose to supersede Airworthiness Directive (AD) 2005-13-05, which applies to certain Boeing Model 747-400F series airplanes. AD 2005-13-05 currently requires inspections for cracking of the web, upper chord, and upper chord strap of the upper deck floor beams, and repair of any cracking. AD 2005-13-05 also requires a preventive modification of the upper deck floor beams, and repetitive inspections for cracking after accomplishing the modification. Since we issued AD 2005-13-05, the upper chords of the upper deck floor beams at certain stations have been determined to be structures that are susceptible to widespread fatigue damage, and certain airplanes with an initial modification require a second modification for the airplane to meet its limit of validity (LOV). This proposed AD would require that second modification and repetitive inspections for cracking and repair if necessary. We are proposing this AD to detect and correct fatigue cracking in certain upper chords of the upper deck floor beam, which could result in reduced structural integrity of the airplane and rapid decompression or reduced controllability of the airplane.

**DATES:** We must receive comments on this proposed AD by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to <http://www.regulations.gov>. Follow the instructions for submitting comments.
- Fax: 202-493-2251.
- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE., Washington, DC 20590.
- Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this proposed AD, contact Boeing Commercial Airplanes, Attention: Data & Services Management, P. O. Box 3707, MC 2H-65, Seattle, WA 98124-2207; telephone 206-544-5000, extension 1; fax 206-766-5680; Internet <https://www.myboeingfleet.com>. You may view this referenced service information at the FAA, 1601 Lind Avenue SW., Renton, WA. For information on the availability of this material at the FAA, call 425-227-1221.

#### **Examining the AD Docket**

You may examine the AD docket on the Internet at <http://www.regulations.gov> by searching for and locating Docket No. FAA-2014-0170; or in person at the Docket Management Facility between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this proposed AD, the regulatory evaluation, any comments received, and other information. The street address for the Docket Office (phone: 800-647-5527) is in the ADDRESSES section. Comments will be available in the AD docket shortly after receipt.

**FOR FURTHER INFORMATION CONTACT:** Nathan Weigand, Aerospace Engineer, Airframe Branch, ANM-120S, FAA, Seattle Aircraft Certification Office

(ACO), 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6428; fax: 425-917-6590; email: [Nathan.P.Weigand@faa.gov](mailto:Nathan.P.Weigand@faa.gov).

## **SUPPLEMENTARY INFORMATION:**

### **Comments Invited**

We invite you to send any written relevant data, views, or arguments about this proposed AD. Send your comments to an address listed under the ADDRESSES section. Include “Docket No. FAA-2014-0170; Directorate Identifier 2013-NM-169-AD” at the beginning of your comments. We specifically invite comments on the overall regulatory, economic, environmental, and energy aspects of this proposed AD. We will consider all comments received by the closing date and may amend this proposed AD because of those comments.

We will post all comments we receive, without change, to <http://www.regulations.gov>, including any personal information you provide. We will also post a report summarizing each substantive verbal contact we receive about this proposed AD.

### **Discussion**

Structural fatigue damage is progressive. It begins as minute cracks, and those cracks grow under the action of repeated stresses. This can happen because of normal operational conditions and design attributes, or because of isolated situations or incidents such as material defects, poor fabrication quality, or corrosion pits, dings, or scratches. Fatigue damage can occur locally, in small areas or structural design details, or globally. Global fatigue damage is general degradation of large areas of structure with similar structural details and stress levels. Multiple-site damage is global damage that occurs in a large structural element such as a single rivet line of a lap splice joining two large skin panels. Global damage can also occur in multiple elements such as adjacent frames or stringers. Multiple-site-damage and multiple-element-damage cracks

are typically too small initially to be reliably detected with normal inspection methods. Without intervention, these cracks will grow, and eventually compromise the structural integrity of the airplane, in a condition known as widespread fatigue damage (WFD). As an airplane ages, WFD will likely occur, and will certainly occur if the airplane is operated long enough without any intervention.

The FAA's WFD final rule (75 FR 69746, November 15, 2010) became effective on January 14, 2011. The WFD rule requires certain actions to prevent structural failure due to WFD throughout the operational life of certain existing transport category airplanes and all of these airplanes that will be certificated in the future. For existing and future airplanes subject to the WFD rule, the rule requires that design approval holders (DAHs) establish LOV of the engineering data that support the structural maintenance program. Operators affected by the WFD rule may not fly an airplane beyond its LOV, unless an extended LOV is approved.

The WFD rule (75 FR 69746, November 15, 2010) does not require identifying and developing maintenance actions if the DAHs can show that such actions are not necessary to prevent WFD before the airplane reaches the LOV. Many LOVs, however, do depend on accomplishment of future maintenance actions. As stated in the WFD rule, any maintenance actions necessary to reach the LOV will be mandated by airworthiness directives through separate rulemaking actions.

In the context of WFD, this action is necessary to enable DAHs to propose LOVs that allow operators the longest operational lives for their airplanes, and still ensure that WFD will not occur. This approach allows for an implementation strategy that provides flexibility to DAHs in determining the timing of service information development (with FAA approval), while providing operators with certainty regarding the LOV applicable to their airplanes.

On June 10, 2005, we issued AD 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005) for certain Boeing Model 747-400F series airplanes. AD 2005-13-05 requires initial detailed and open-hole high frequency eddy current inspections for cracking of the web, upper chord, and upper chord strap of the upper deck floor beams, and repair of any cracking. AD 2005-13-05 also requires a preventive modification of the upper deck floor beams, and repetitive inspections for cracking after accomplishing the modification. AD 2005-13-05 resulted from reports of fatigue cracking found on the upper deck floor beam to frame attachment points. We issued AD 2005-13-05 to prevent fatigue cracks in the upper chord, upper chord strap, and the web of the upper deck floor beams and resultant failure of the floor beams.

**Actions Since AD 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005) Was Issued**

Since we issued AD 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005), we received reports that indicate that the upper chords of the upper deck floor beams at stations (STA) 340 through 520 have been determined to be structures that are susceptible to widespread fatigue damage, and airplanes that had an initial modification done before 15,000 total flight cycles require a second fastener hole zero-timing modification for the airplane to meet its LOV.

**Relevant Service Information**

We reviewed Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013. For information on the procedures and compliance times, see this service information at <http://www.regulations.gov> by searching for Docket No. FAA-2014-0170.

### **FAA's Determination**

We are proposing this AD because we evaluated all the relevant information and determined the unsafe condition described previously is likely to exist or develop in other products of the same type design.

### **Proposed AD Requirements**

This proposed AD would retain all of the requirements of AD 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005). This proposed AD would also require accomplishing the actions specified in the service information described previously.

### **Difference Between this Proposed AD and Service Information**

The service bulletin specifies to contact the manufacturer for instructions on how to repair certain conditions, but this proposed AD would require repairing those conditions in one of the following ways:

- In accordance with a method that we approve; or
- Using data that meet the certification basis of the airplane, and that have been approved by the Boeing Commercial Airplanes Organization Designation Authorization (ODA) whom we have authorized to make those findings.

### **Explanation of Compliance Time**

The compliance time for the modification specified in this proposed AD for addressing WFD was established to ensure that discrepant structure is modified before WFD develops in airplanes. Standard inspection techniques cannot be relied on to detect WFD before it becomes a hazard to flight. We will not grant any extensions of the compliance time to complete any AD-mandated service bulletin related to WFD without extensive new data that would substantiate and clearly warrant such an extension.

## Costs of Compliance

We estimate that this proposed AD affects 13 airplanes of U.S. registry.

We estimate the following costs to comply with this proposed AD:

### Estimated costs

Action	Labor cost	Parts cost	Cost per product	Cost on U.S. operators
Pre-modification inspections [retained actions from AD 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005).	11 work-hours X \$85 per hour = \$935	\$0	\$935	\$12,155
Modification/ inspections done during modification [retained actions from AD 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005).	Up to 524 work-hours X \$85 per hour = \$44,540	Up to \$14,874	\$59,414	\$772,382
Post-modification inspections [retained actions from AD 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005).	66 work-hours X \$85 per hour = \$5,610	\$0	\$5,610	\$72,930
Zero-Timing Procedure Option 1 (including inspections) (proposed action)	71 work-hours X \$85 per hour = \$6,035	\$0	\$6,035	Up to \$78,455
Zero-Timing Procedure Option 2 (including inspections) (proposed action)	103 work-hours X \$85 per hour = \$8,755	\$0	\$8,755	Up to \$113,815

We have received no definitive data that would enable us to provide cost estimates for the on-condition actions specified in this proposed AD. We have no way of determining the number of products that may need these actions.

### **Authority for this Rulemaking**

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, Section 106, describes the authority of the FAA Administrator. Subtitle VII, Aviation Programs, describes in more detail the scope of the Agency's authority.

We are issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701, "General requirements." Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

### **Regulatory Findings**

We have determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would not have a substantial direct effect on the States, on the relationship between the national Government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify that the proposed regulation:

- (1) Is not a "significant regulatory action" under Executive Order 12866,
- (2) Is not a "significant rule" under the DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979),
- (3) Will not affect intrastate aviation in Alaska, and
- (4) Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.



## **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

### **The Proposed Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 14 CFR part 39 as follows:

### **PART 39 - AIRWORTHINESS DIRECTIVES**

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

#### **§ 39.13 [Amended]**

2. Amend § 39.13 by removing Airworthiness Directive (AD) 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005), and adding the following new AD:

**The Boeing Company:** Docket No. FAA-2014-0170; Directorate Identifier 2013-NM-169-AD.

#### **(a) Comments Due Date**

The FAA must receive comments on this AD action by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

#### **(b) Affected ADs**

This AD supersedes AD 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005).

#### **(c) Applicability**

This AD applies to The Boeing Company Model 747-400F series airplanes, certificated in any category, as identified in Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013.

**(d) Subject**

Air Transport Association (ATA) of America Code 53, Fuselage.

**(e) Unsafe Condition**

This AD was prompted by a report indicating that the upper chords of the upper deck floor floor beams at stations (STA) 340 through 520 have been determined to be structures that are susceptible to widespread fatigue damage, and airplanes that had an initial modification done before 15,000 total flight cycles require a second fastener hole zero-timing modification for the airplane to meet its limit of validity (LOV). We are issuing this AD to detect and correct fatigue cracking in certain upper chords of the upper deck floor beam, which could result in reduced structural integrity of the airplane and rapid decompression or reduced controllability of the airplane.

**(f) Compliance**

Comply with this AD within the compliance times specified, unless already done.

**(g) Retained Inspections with Revised Service Information**

This paragraph restates the requirements of paragraph (g) of AD 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005), with revised service information. Before the accumulation of 15,000 total flight cycles, or within 1,000 flight cycles after July 27, 2005 (the effective date of AD 2005-13-05 whichever is later: Accomplish detailed and open-hole high frequency eddy current (HFEC) inspections for cracking of the web, upper chord, and upper chord strap of the upper deck floor beams, by doing all the applicable actions in accordance with Part 3.B.1. of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, dated May 9, 2002; or Part 1 of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013. As of the effective date of this AD, only Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013, may be used.

**(h) Retained Repair with Revised Service Information and Revised Repair Approval Language**

This paragraph restates the requirements of paragraph (h) of AD 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005), with revised service information and revised repair approval language. If any crack is found during any inspection required by paragraph (g) of this AD: Before further flight, accomplish the actions required by paragraph (h)(1) and (h)(2) of this AD.

(1) Repair in accordance with the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, dated May 9, 2002; or Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013; except where these service bulletins specify to contact Boeing for appropriate action, before further flight, repair the cracking using a method approved in accordance with the procedures specified in paragraph (o) of this AD. After the effective date of this AD, only Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013, may be used.

(2) Accomplish the inspections and preventive modification of the floor beams by doing all the actions in accordance with Part 3.B.2. or Part 3.B.3., as applicable, of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, dated May 9, 2002, or Part 2 or Part 3 of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013. If any crack is found during any inspection, before further flight, repair as required by paragraph (h)(1) of this AD. After the effective date of this AD, only Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013, may be used.

**(i) Retained Modification with Revised Service Information**

This paragraph restates the requirements of paragraph (i) of AD 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005), with revised service information. If no crack is found during any inspection required by paragraph (g) of this AD:

Accomplish the actions required by either paragraph (i)(1) or (i)(2) of this AD, at the time specified.

(1) Before further flight: Accomplish the inspections and preventive modification of the floor beam by doing all the actions in accordance with Part 3.B.2 or Part 3.B.3., as applicable, of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, dated May 9, 2002; or Part 2 or Part 3 of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013. If the preventive modification is performed concurrently with the inspections required by paragraph (g) of this AD, the upper chord straps must be removed when performing the open-hole HFEC inspection. If any crack is found during any inspection, before further flight, repair as required by paragraph (h)(1) of this AD. After the effective date of this AD, only Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013, may be used.

(2) Before the accumulation of 20,000 total flight cycles, or within 1,000 flight cycles after July 27, 2005 (the effective date of AD 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005), whichever is later: Accomplish the inspections and preventive modification of the upper deck floor beams, by doing all the actions in accordance with Part 3.B.2. or 3.B.3. as applicable, of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, dated May 9, 2002; or Part 2 or Part 3, as applicable, of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013. If any crack is found during any inspection, before further flight, repair as required by paragraph (h)(1) of this AD. After the effective date of this AD, only Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013, may be used.

**(j) Retained Post-Modification Inspections with Revised Service Information**

This paragraph restates the requirements of paragraph (j) of AD 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005), with revised service information. Within 15,000 flight cycles after accomplishing the applicable preventive modification required by paragraph (h)(2), (i)(1), or (i)(2) of this AD: Accomplish the inspections required by either paragraph (j)(1) or (j)(2) of this AD; if any crack is found during any inspection, before further flight, repair as required by paragraph (h)(1) of this AD.

(1) Accomplish detailed and surface HFEC inspections for cracking of the web, upper chord, and upper chord strap of the upper deck floor beams, by doing all the applicable actions in accordance with Part 3.B.4. of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, dated May 9, 2002; or Part 4 of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013. If no crack is found, repeat the inspections at intervals not to exceed 1,000 flight cycles. After the effective date of this AD, only Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013, may be used.

(2) Accomplish detailed and open-hole HFEC inspections for cracking of the web, upper chord, and strap of the upper deck floor beams, by doing all the applicable actions in accordance with Part 3.B.5. of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, dated May 9, 2002; or Part 5 of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013. If no crack is found, repeat the inspections at intervals not to exceed 5,000 flight cycles. After the effective date of this AD, only Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013, may be used.

**(k) New Floor Beam Hole Zero-Timing**

Within 20,000 flight cycles after accomplishing the preventive modification of the Station 340 to Station 520 upper deck floor beams specified in paragraph (h)(2), (i)(1), or (i)(2) of this AD, or within 1,000 flight cycles after the effective date of this AD, whichever occurs later: Accomplish the floor beam hole zero-timing in accordance with Part 6. of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013.

**(l) New Post-Floor Beam Hole Zero-Timing Inspections**

Within 15,000 flight cycles after accomplishing the floor beam hole zero-timing required by paragraph (k) of this AD: Accomplish the inspections required by either paragraph (l)(1) or (l)(2) of this AD; if any cracking is found during any inspection, before further flight, repair as required by paragraph (h)(1) of this AD.

(1) Accomplish detailed and surface HFEC inspections for cracking of the web, upper chord, and straps of the Station 340 to Station 520 upper deck floor beams, by doing all the applicable actions, in accordance with Part 4 of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013. If no cracking is found, repeat the inspections at intervals not to exceed 1,000 flight cycles.

(2) Accomplish detailed and open-hole HFEC inspections for cracking of the web, upper chord, and straps of the Station 340 to Station 520 upper deck floor beams, by doing all the applicable actions, in accordance with Part 5. of the Accomplishment Instructions of Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013. If no cracking is found, repeat the inspections at intervals not to exceed 5,000 flight cycles.

**(m) Exception to Service Information**

Where Boeing Service Bulletin 747-53A2443, Revision 2, dated August 2, 2013, specifies a compliance time “after the revision date on this service bulletin,” this AD requires compliance within the specified compliance time after the effective date of this AD.

**(n) Credit for Previous Actions**

This paragraph provides credit for the inspections, repairs, and modification required by paragraphs (g) through (j) of this AD, if the corresponding actions were performed before the effective date of this AD using Boeing Service Bulletin 747-53A2443, Revision 1, dated June 25, 2009.

**(o) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, Seattle Aircraft Certification Office (ACO), FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the ACO, send it to the attention of the person identified in paragraph (p)(1) of this AD. Information may be emailed to:

[9-ANM-Seattle-ACO-AMOC-Requests@faa.gov](mailto:9-ANM-Seattle-ACO-AMOC-Requests@faa.gov).

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(3) An AMOC that provides an acceptable level of safety may be used for any repair required by this AD if it is approved by Boeing Commercial Airplanes Organization Designation Authorization (ODA) that has been authorized by the Manager, Seattle ACO to make those findings. For a repair method to be approved,

the repair must meet the certification basis of the airplane, and the approval must specifically refer to this AD.

(4) AMOCs approved for AD 2005-13-05, Amendment 39-14141 (70 FR 35989, June 22, 2005), are approved as AMOCs for the corresponding requirements of paragraphs (g) through (j) (the retained actions) of this AD.

**(p) Related Information**

(1) For more information about this AD, contact Nathan Weigand, Aerospace Engineer, Airframe Branch, ANM-120S, FAA, Seattle Aircraft Certification Office (ACO), 1601 Lind Avenue SW., Renton, WA 98057-3356; phone: 425-917-6428; fax: 425-917-6590; email: [Nathan.P.Weigand@faa.gov](mailto:Nathan.P.Weigand@faa.gov).

(2) For service information identified in this AD, contact Boeing Commercial Airplanes, Attention: Data & Services Management, P. O. Box 3707, MC 2H-65, Seattle, WA 98124-2207; telephone 206-544-5000, extension 1; fax 206-766-5680; Internet <https://www.myboeingfleet.com>. You may review copies of the referenced service information at the FAA, Transport Airplane Directorate, 1601 Lind Avenue SW., Renton, WA. For information on the availability of this material at the FAA, call 425-227-1221.

Issued in Renton, Washington, on March 17, 2014.

Dionne Palermo,  
Acting Manager,  
Transport Airplane Directorate,  
Aircraft Certification Service.

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